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does not think he is expressing too heretical an opinion when he doubts the great importance of this region in the primary classification of the reptiles. The grouping of the reptiles into two subclasses, the Diapsida and Synapsida, based chiefly upon the temporal structure, is rejected by most students of the reptiles, and the very aberrant structure of this region in the pelycosaurs, especially the presence of a "prosquamosal" bone, rather shakes one's faith. However, we are not quarrelling with the author for not going into these doubtful discussions. He has, what is better, given us excellent material for future philosophizing in his full and lucid descriptions and many illustrations.

S. W. WILLISTON.

**The Conrad Fissure.**<sup>1</sup>—Mr. Brown has given us in this paper an excellent critical and descriptive list, well illustrated, of a very important pleistocene bone deposit, especially interesting as located in the southwest. The material, for the most part collected, and it need not be said skillfully collected by the author, is abundant, including seven species of insectivores, two of bats, nineteen of carnivores, as many of rodents, and nine of ungulates, together with several of amphibians and reptiles. Of these he describes a new twenty species and two genera, the more noteworthy of the new genera being one of a new type of saber-toothed cats. Conspicuous for their absence are remains of the large edentates and of the proboscideans, from which the author is inclined to the belief that the former, at least, were not then in existence in North America. That some of the sloths were in existence in South America at that period is more than probable, if we take into account Gryphotherium, and the same logic would exclude the proboscideans from the fauna, which is not at all probable. He also concludes that the fauna was boreal, as indeed would be indicated by the remains of musk oxen. The paper is a valuable addition to our faunal pleistocene literature.

S. W. WILLISTON.

**The Ankylosauridae.**<sup>1</sup>—Mr. Brown has given us a rather startling restoration of what he believed to be a new family of

<sup>1</sup> Brown, Barnum. The Conrad Fissure, A Pleistocene Bone Deposit in Northern Arkansas, with Descriptions of Two New Genera, and Twenty New Species of Mammals. *Mem. Amer. Mus. Nat. Hist.*, IX, pp. 157-208, pls. XXIV, XXV, 1908.

<sup>1</sup> Brown, Barnum. The Ankylosauridae, A New Family of Dinosaurs from the Upper Cretaceous. *Bulletin of the American Museum Nat. Hist.*, X, XXIV, pp. 187-201, 1908.

armored dinosaurs from the Hell Creek Beds of Montana. The material, however, upon which he bases his restoration was scanty—too scanty to serve as a satisfactory basis for a restoration—consisting of the skull, a number of vertebræ, a somewhat problematical scapula, and a number of dermal scutes. The dangers of such attempted restorations as the present one on such imperfect material are apparent here, since *Ankylosaurus* is either very closely allied to or identical with *Stegopelta* Williston, a genus overlooked by Mr. Brown. And *Stegopelta*, which is represented by considerable material in the University of Chicago collections, is as closely allied as well may be with *Polacanthus* Hulke of England, and must go in the same family. A comparison of Nopsca's restoration of *Polacanthus*, which is essentially correct, save for the skull, will show the real form of *Ankylosaurus*, very different from that given by Mr. Brown. *Stegopelta*, moreover, has spines, and the body is covered in large part by small scutes, though there are also large ones, as figured by Mr. Brown; and the tail rings are correctly placed by Brown. The writer has examined the specimen in the British Museum, and is assured of the relationships. *Stegopelta* will shortly be more fully described and figured by Dr. Moodie.

S. W. WILLISTON.

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## PARASITOLOGY

**The Evolution of Parasitism.**—In a recent paper entitled: "The Influence of Symbiosis upon the Pathogenicity of Microorganisms (The Evolution of Parasitism)," Musgrave<sup>1</sup> has brought together some most important items in an extremely suggestive manner. He defines symbiosis as representing all phases of association between living organisms, beginning with commensalism, on the one hand, and including true parasitism, on the other, in which either component is influenced in nutrition, metabolism, production or in some other manner by the presence of the other. While this use of the term is distinctly new and rather at variance with the older usage of van Beneden the meaning of the author is clear. He endeavors to show that symbiotic combinations between microorganisms are responsible for uninterpreted phenomena in the etiology and pathology of disease. Furthermore, he adduces evidence to show that changes in symbiosis may produce changes in metabolism and also, as a result of this,

<sup>1</sup> *Philippine Jour. Sc.*, B 3: 78.